COMMENTARY

Summation of the International Conference on Radiation and Health: Radiobiology Viewpoint

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The idea to hold an international conference on radiation and health arose as a natural response to the mounting evidence of serious health effects on populations resulting from the Chernobyl accident. The nature of the Chernobyl accident, where large amounts of radioactive nuclides spread in the reactor area and all over Europe, dictated the emphasis of the presented papers covering both direct radiation effects and effects of radioactive contaminants on large populations. In addition to classical radiobiologic studies of the effects of radiation on cells, organs, humans and their environment, basic studies of DNA damage and repair, the possibility to enhance and repair, and studies of radioprotectors, emphasis was directed at the effects of radiation on large populations and at the inaccuracy of dosimetry. The lack of accurate physical dosimetry resulted in the need to develop new methods of biological dosimetry. Health effects as a result of Chernobyl were expressed in many disorders, some not recognized before as radiation effects, and many related to psychosocial behavioral symptoms. Special emphasis was given to the plight of liquidators who were exposed while carrying out cleanup operations around the reactor and to the observed increase in thyroid cancer among area inhabitants. All of the observations and results were taken into consideration when discussing and proposing appropriate health policies based on risk analysis and the observed phenomena. — *Environ Health Perspect* 105(Suppl 6):1609–1610 (1997)

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In the field of radiobiology there used to be two distinct terms: radiation biology involved studies of the effects of external radiations, whereas radiobiology was the study of isotopes, their distribution in the environment, and their effects when present as contaminants in the environment and in the body. Today the terms are used loosely together and both fields were discussed interactively at the International Conference on Radiation and Health. Dozens of papers covered both these fields and provided new views and results. As became apparent at the conference, the accident in Chernobyl and those in other places in the Soviet Union revived the questions of dispersion of radioactive isotopes and their eventual effects on individuals and whole populations. Topics discussed included levels of environmental contamination and the calculation of individual as well as population doses. The nature of the contaminants was one aspect, but more important were the questions of dosimetry raised by contaminant distribution. To a greater extent than the Hiroshima and Nagasaki catastrophies, the effects of internal contamination by isotopes in Chernobyl was a major issue. Because ^{131}I was spread at first in tremendous quantities the problem of thyroid cancer became a central issue. Health physics requires accurate dosimetry; there was much discussion of these aspects. Because accurate physical dosimetry is obviously a problem with the Chernobyl accident, the need for biological dosimetry is apparent and several papers dealt with new methods for biological dosimetry and indicators of exposure. As some of the methodology of biologic dosimetry indicates damage to DNA, it naturally followed that a separate group of papers was dedicated to discussions on DNA damage and repair. Special attention was given to the so-called liquidators—persons who were employed in cleanup operations and some of whom suffered the highest exposure to external radiation as well as to internal contaminants. This group presents both biologic effects of external radiation and radiobiologic studies of the effects of isotopes as contaminants within the body. Indeed, there were several papers on the plight of the liquidators and much of the conference evolved around their problems and their need for special attention and care. Many of the effects seen in this group or felt by them led to a unique topic of psychosocial studies, a topic not usually included in ordinary radiation biology symposia. This topic had a central role in this conference and will probably be included in future conferences dealing with exposure of populations.

In radiation biology there were papers on effects on organs and organ systems and on populations. As thyroid cancers seem to be the most significant health effects in populations living around Chernobyl, this problem was discussed extensively. Comparisons were made between the Chernobyl population and the Hanford workers thyroid disease study. Thyroid cancers among children and adults living around Obninsk, Bryansk, Kaluga, and Tula (all sites of accidents with dispersion of radionuclides) were compared as well. Population studies in particular were stressed at the conference, which led to discussions on occupational and long-term exposures, with special attention to risk analysis and health policy.

Another important topic of radiation biology received attention in papers on radioprotectors and the possibility of modifying radiation damages by their use.

This conference was different from most radiation research meetings in that rather than featuring presentations about planned experiments on laboratory animals, effects on populations were emphasized and specific organ effects and their occurrence in large populations were also described. Populations were in effect the laboratory for this conference and radiobiologic principles and mechanisms were discussed with special attention to what they can contribute toward understanding the health effects seen among exposed populations still living in contaminated areas.

Numerous topics of radiobiology and radiation biology were covered in the context of trying to understand the events

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from the moment of accident through the dispersion of radionuclides and the resulting effects as seen today. New venues of understanding the effects, their medical expression, the psychosocial effects, and the long-term chronic effects should be helpful to the medical community whose task is to take care of those affected, alleviate their symptoms, and find a possible cure.

We believe the conference and this monograph will lead to a better understanding of radiation and health that can, in turn, provide a better basis for risk analysis and health policies suitable for offsetting the hazards that may appear after a major radiation event.